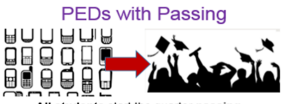
SWBAT

Communicate force, time, and momentum for water balloon experiment

Sep 4-7:31 AM

Welcome!!!

SECA CP Physics
Tuesday 17 May 2016



H. Leslie Grebe
Room C-244

Centering (quote)

- Show me SchoolView if you want phone in class...

Project Rough Draft due Thurs 5/19: ***Something*** for each of the 6 sections.

Opening Activity: Quick Write

What question are you trying to answer? What data do you need to answer that?

$V = \frac{\Delta x}{\Delta t}$

MOMENTUM: $p = m \cdot v$

OF FARTHEST Δx WITHOUT BREAKING

F?

We aim above the mark to hit the mark. Ralph Waldo Emerson

Sep 7-7:04 AM

InterActive Notebook - Table of Contents

Unit_____ Chapters_____ Date_____

Sep 5-9:09 AM

State the Challenge **Example...**

We are trying to figure out what the friction of the cart is, we had a pulley which was attached to the table, we had a timer which told us the time of when it stopped we had the string attached to the cart and we had weights which was being sat inside the cart along with slo-pro to slow down what and how it stopped or started.

MATERIALS
- Cart
- Pulley
- Rope
- Weights
- Timer
- Slo-Pro app

Method:

One person held the cart with the mass at its farthest displacement away from the end of the pulley.

Then we marked where the starting point was with a piece of tape.

At the end string there we attached a weight to pull.

Then another person gets ready to stop the cart right when it hits the end of the pulley system.

One more person sets up the Slo-Pro App and the timer.

The same person starts the timer and Slo-Pro then signals the person holding the cart to let go when they are ready.

Then after the cart started going the other person waiting for the cart to stop: stops it when the cart hits the end of the pulley system.

Afterwards, we look back at the Slo-Pro app and get the times the cart was let go and the time the cart hits the end of the pulley system.

Data:

Displacement: 69.7 cm
Velocity Initial: 0 m/s
Mass in cart: 1000 g

Trials	Release Time	Stop Time	Change in Time
3	3.3 sec	7.8 sec	4.5 sec
4	3.9 sec	7.7 sec	3.8 sec

Assumptions:

We assumed the table was smooth and the equipment would have high consistency.

We used UAM equations in our results, so we are assuming the acceleration is _____.

Results:

EACH CALC:
- WHAT YOU PUT IN
- WHAT EQUATION
- WHAT YOU GOT OUT

Value Claim:

Companies for cars probably do experiments all the time so they can tell how well cars navigate on icy or otherwise compromised roads. I think maybe people who create amusement park rides like roller coasters, etc. would also care. They would probably like there to be the least amount of friction possible without it being dangerous.

Looking forward: If we were to re-do this experiment next year and had more time/ better equipment, give me a couple ideas about how we could get an answer with less error.

GLOSSARY
- MASS
- ACCELERATION
- FRICTION

Feb 26-9:09 AM

PG TO

MATERIALS

- WATER BALLOONS
- WATER
- SCALE
- RULER
- SLOW MO APP/TIMER

HOW MUCH MOMENTUM DOES THE WATER BALLOON HAVE FOR FURTHEST DISTANCE WE CAN THROW/CATCH WITHOUT IT BREAKING?

MINIMUM SPEED TO THE GO DISTANCE

& WHAT IS THE AVG. FORCE

↳ PRESSURE: = FORCE / AREA

$F = m \cdot a$ ($a = \frac{\Delta v}{\Delta t}$)

$F = \frac{\Delta p}{\Delta t}$ ($\Delta p = m \cdot \Delta v$)

GO WITH THE MOTION, MORE TIME TO SLOW IT DOWN

← CHANGING ITS MOMENTUM: p

May 10-9:51 AM

Opening Activity: Quick Write

When does a water balloon have / change momentum?

GIVE BY (-PUSHING / -THROWING)

FILLING IT

↳CATCHING IT

↳MASS X VELOCITY

-DROPPING

How could we measure it?

MASS: SCALE

VELOCITY: TIME IT, RECORD IT, SLO MO

HOW FAR (DISPLACEMENT)

METER STICK

May 12-9:28 AM

Pg 90: What do the equations mean?

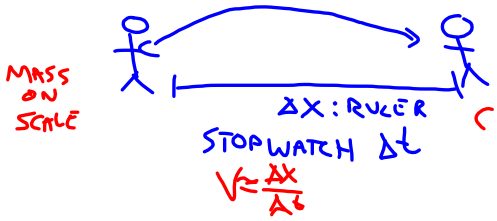
Golf ball slow-motion → COLLISIONS TAKE TIME

- VELOCITY CAN ONLY CHANGE IF THERE IS A NET FORCE
- Δv DEPENDS ON AMOUNT OF TIME FORCE IS APPLIED
- OBJECTS HAVE MASS, SO REALLY Δp

Catching a water balloon

- WATER BALLOON COMING AT YOU HAS p
- YOU WANT IT TO STOP $\Delta p \to 0$.
- BUT BIG FORCES ⇒ BREAK
  FOR PEOPLE, BIG FORCES = OUCH!
- SO MORE TIME TO STOP IT → LESS FORCE

$\Delta p = F \cdot \Delta t$



May 6-9:07 AM

What we should have solid:

Memorize our ~~5~~ 8 12 vocab cards, units, vector or not, definition, formula

Be able to answer distance vs displacement questions

Be able to make measurements of real-life motion. Know what is likely to make timing things difficult and how to get more reliable timing results

Be able to convert between miles and meters, between hours, minutes, and seconds

Be able to calculate speed = dist/time and velocity = disp/time

Know what all of the symbols in the UAM equations stand for and mean

Be able to turn a UAM word problem into a list of knowns and unknowns

Be able to pick the equation with those 4 things in it

Be able to put the knowns into that equation

(Be able to solve for the unknown)

→ PROJECTILES: v_x IS CONSTANT; v_y CHANGES $a_y = -9.8\ m/s^2$ PG 42

PG 43 TIME, Δt, CONNECTS x & y

PG 53 1ST LAW,

PG 49 69 VECTORS INTO x & y, ADD VECTORS SOH-CAH-TOA

PG 59 DIFFERENCE BETWEEN MASS & WEIGHT

PG 61 NET FORCE

PG 63 FREE BODY DIAGRAMS

$F = m \cdot g$

PG 70 $F_F = \mu \cdot N$

QW every day to review - gather responses to front board.

Dec 4-9:15 AM

BACK OF NOTEBOOK:
"PHYSICS CODE WORDS"

MAGNITUDE: SIZE, HOW BIG
VECTORS HAVE MAG. & DIRECTION

HORIZONTAL: SIDEWAYS, LEFT/RIGHT, X-DIRECTION

VERTICAL: UP/DOWN, Y-DIRECTION
"VERY TALL"

AT REST: VELOCITY = 0

CONSTANT SPEED/VELOCITY: BALANCED FORCES,
NET FORCE = 0
ACCELERATION = 0

Σ: "SIGMA", SUM, TOTAL (+ & −) "NET"

NORMAL: SUPPORT FORCE, ON A SURFACE
↳ PERPENDICULAR

TENSION: FORCE FROM A ROPE

Δ: "DELTA" MEANS 'CHANGE IN'
DIFFERENCE, SUBTRACTION
SECOND THING MINUS FIRST THING
EX: $\Delta t = t_{FINAL} - t_{INITAL}$

Mar 30-9:46 AM